Old Mildura Homestead

Self Guided Salinity Tour of Sunraysia

Combining Tourism and Community Education

Old Mildura Homestead

Self Guided Salinity Tour of Sunraysia

Combining Tourism and Community Education

1. Old Mildura Homestead Irrigation and Salinity Display

The Challenge of Salinity display and leaflet offers a focus for the start of this self-guided tour which will hopefully provide you with an enjoyable and educational tour of salinity related sites around the Sunraysia Irrigation District.

Salinity is the greatest environmental threat to the Murray Darling Basin. Current production losses from land salinisation and waterlogging in the major irrigation areas are estimated to be $65 million per year. The cost of current River salinity levels on urban, industrial and agricultural water users is $37 million per year.

It has been said that SALINITY is the issue by which this generation will be judged. A better understanding of the causes and effects will lead to better management of the problem. Salinity is a community problem, requiring a concerted community effort to find a solution.

This self-guided tour is funded through the Victorian State Government Salinity Grant Scheme, and is a contribution from the Management Committee of the Old Mildura Homestead toward a better understanding of salinity.

2. Water Wheel

(Structures 2 and 3 are located within the grounds of the Old Mildura Homestead.)

During the early days of the settlement water wheels would have been seen on many district properties, supplying water for furrow irrigation, which is inherently inefficient due mainly to the variable soil types found throughout the district.

However the availability of electricity for the pumping of water onto properties, and the improvements made in irrigation technology, have allowed for the establishment of on-farm irrigation systems such as low-level and mini-sprinklers along with micro and drip irrigation which allow improved uniformity of water distribution.

Efficient application of irrigation water is an on-farm managment practice which helps combat salinity.

3. Concrete Lined Channel

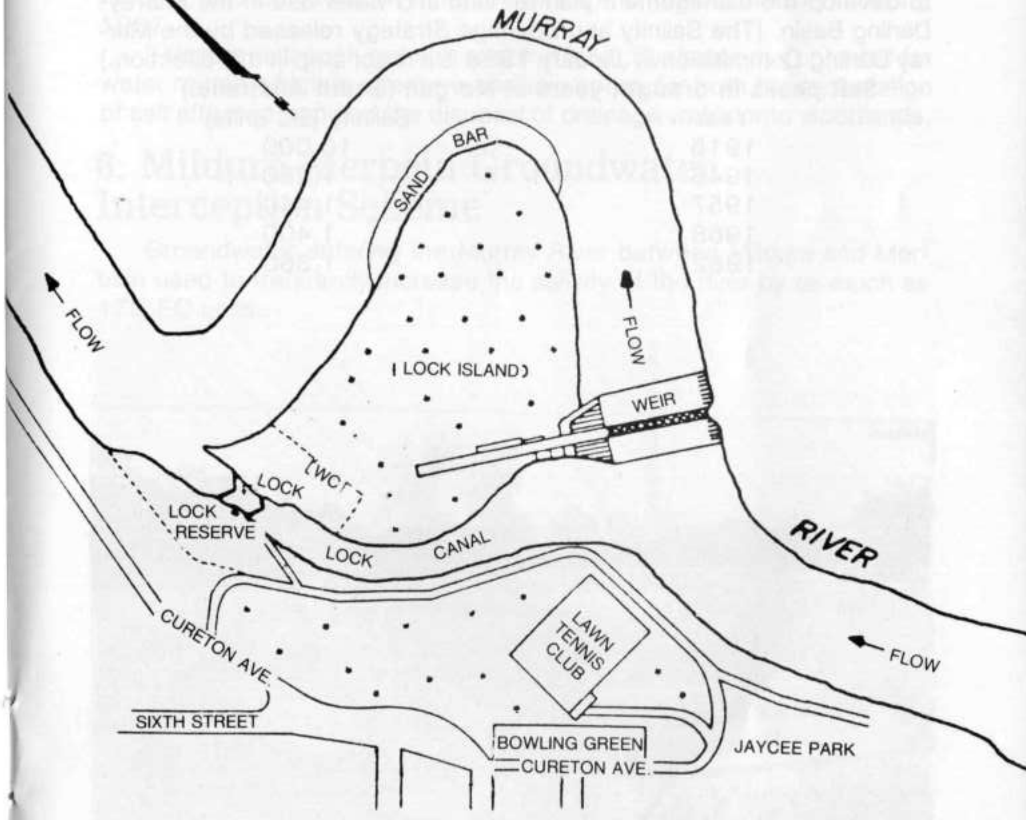
The supply of water to the numerous horticultural properties throughout the Sunraysia district was made possible by the construction of a vast network of earthen and concrete lined channels.

However seepage from the earthen channels and through cracks in the concrete channels has meant that water has been lost through the soil to the watertable. A rise in the watertable has contribtuted to the salinity problems of the area. Conversion of channels to pipelines is an important priority for Sunraysia. At present the Merbein district is 98% pipelined, Mildura about 70%, and Red Cliffs about 60%.

4. The Mildura Weir System

The system of weirs and locks on the Murray River was designed to provide stable pools for irrigation diversions and to enable navigation of the river throughout the year.

The Mildura Weir and Lock II were completed in 1927, the first river steamer passing through the lock on 2nd August, 1927. The Mildura Weir set-up is rather unique in that it is the only site on the Murray where a lock and weir are separated by an island. The island comprises 15 hectares of bushland.



It is the river's eleventh weir, and is situated 878 kms from the mouth of the Murray.

The weir pool is 34.5 metres above sea level and has a storage capacity of 36,200 ML.

The difference between the river levels upstream and downstream of the weir is normally 3.7 metres.

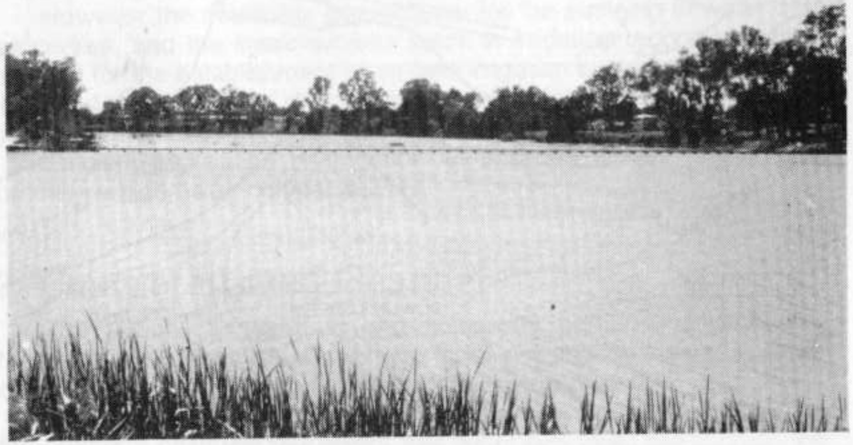
The system of locks, weirs, and dams on the Murray River have enabled the regulation of river flows and reduced the effects of extremes of salinity levels in the river.

Water quality is significantly better in low flow periods under current conditions of development than they were before the system of locks, weirs, and dams were installed on the Murray River.

Continued and sustained efforts over many years will be necessary to develop the management plan for land and water use in the Murray-Darling Basin. (The Salinity and Drainage Strategy released by the Murray Darling Commission in January 1988 is a major step in this direction.)

Salt peaks in drought years at Morgan (South Australia.)

Year	Salinity (EC units)
1915	10,000
1945	1,250
1957	1,440
1968	1,400
1982	1,360



1 ML = 1,000,000 Litres.

1 EC = a unit of conductivity (the higher the EC value, the more salt there is in the water. 800 EC is the World Health Organisation maximum desirable level for drinking water.)

5. Sunraysia Water Board — Waste Water Re-Use

Water is a scarce and valuable resource. Irrigators and urban water users have a responsibility to make the best possible use of the available water and where practicable re-use the water if it is of a suitable quality.

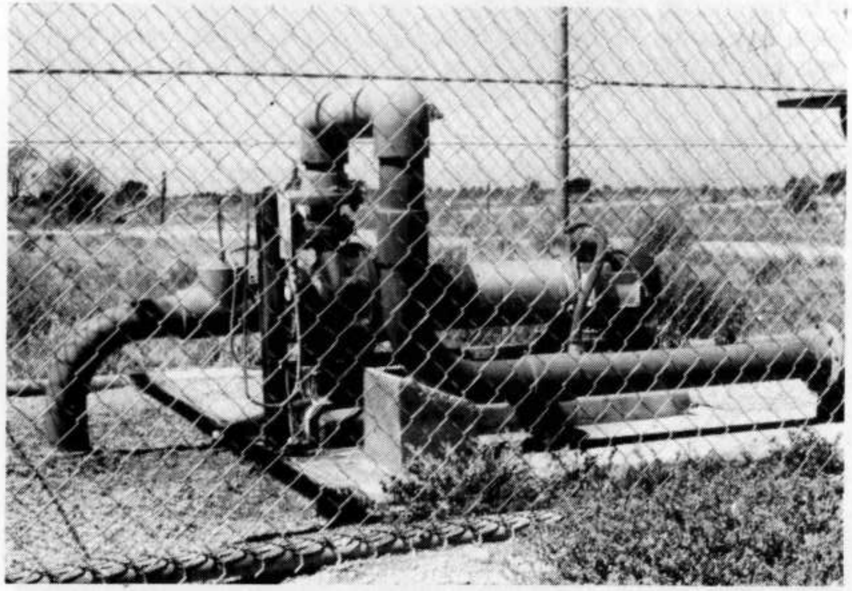
The Sunraysia Water Board is applying the principle of water re-use with the controlled distribution of treated sewerage water onto plantings of selected species of trees.

The trees visible from Eighth Street include River Red Gum (Eucalyptus camaldulensis — from the Lake Albacutya provenance), Eucalyptus occidentalis, and the West Australian Swamp Sheoak (Casurina Obesa.) The trees were supplied by the Conservation, Forests, and Lands nursery, near Apex Park, and were planted in Spring 1987.

This site, although not salt affected land, illustrates the potential for water re-use which is offering a realistic option for both the reclamation of salt affected land and the disposal of drainage water onto woodlands.

6. Mildura-Merbein Groundwater Interception Scheme

Groundwater entering the Murray River between Mildura and Merbein used to frequently increase the salinity of the river by as much as 170 EC units.



The opening of the Groundwater Interception scheme between Mildura and Merbein in 1978 began the interception of seepage into the Murray along the entire length of the river between Mildura and Merbein.

Groundwater is pumped from 17 bores and disposed of into Lake Ranfurly. Any water that does not evaporate there is pumped to the Wargan Basins through a rising main that is connected to the pipeline from Lake Hawthorn.

The scheme cost $2.15 million and is estimated to prevent 24,000 tonnes of salt from entering the Murray River each year, and helps reduce the river salinity at Merbein by an average of 19 EC units.

At times of lower than average river flow, when salinity conditions are most significant, the reduction achieved is greater — up to 60 EC units.

The Victorian Interception works are complemented by a similar interception scheme in New South Wales.

7. Lake Ranfurly Reafforestation Project

The construction of the roadway, severe droughts and the salt infestation of the roadside along the Lake Ranfurly frontage to Ranfurly Way, have resulted in the deterioration of the roadside environment.

This area consists of moderately saline, grey cracking clay soil with a water-table depth of approximately 1.50 metres. Existing vegetation consists of scattered Black Box, Acacias and various Salt Bushes.

The Shire of Mildura has undertaken to re-establish the indigenous flora, fight the salt infestation, provide an alternative seed source, and demonstrate the planting of rare and localised tree species.

The selected species planted to date include Casurina Obesa (Swamp Sheoak from the Karadoc Provenance), and a range of Eucalypts including Broken Hill Red Gum, Stocking Gum, Swamp Yate, Sargent Mallet and Swamp Mallet.

Approximately 8,000 trees were planted in September 1986, further replants of approximately 900 trees were carried out in May/June 1987.

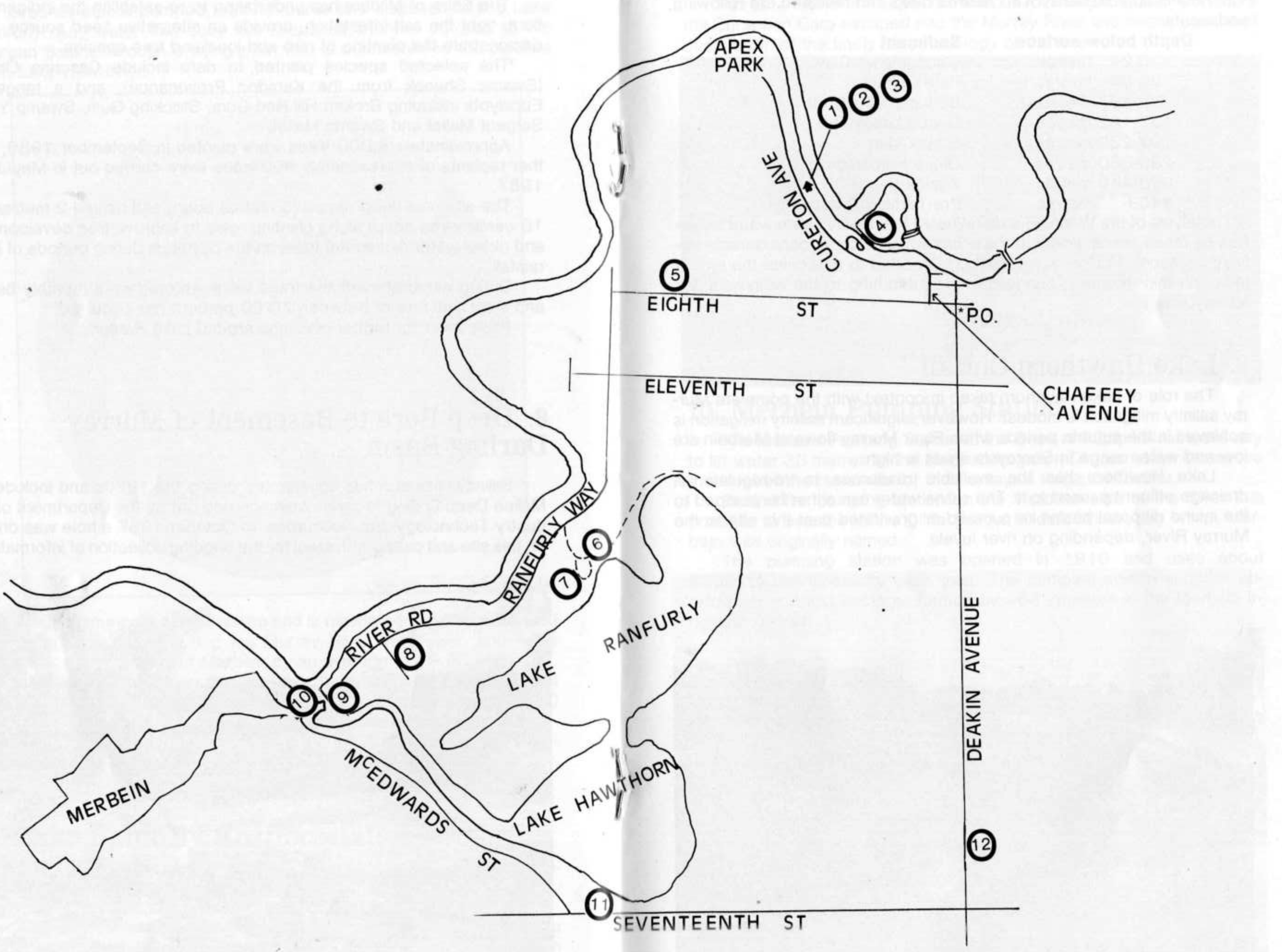
The site was deep ripped (5 metres apart) and delved 2 metres by 10 centimetres deep) along planting rows to improve tree development and direct water movement towards the plantings during periods of high rainfall.

During establishment the trees were watered on a monthly basis, and a survival rate of between 70-80 percent has occurred.

Plans exist for further plantings around Lake Ranfurly.

8. Deep Bore to Basement of Murray Darling Basin

Salinity research has accelerated during the 1980s and includes a Mallee Deep Drilling Program being carried out by the Department of Industry Technology and Resources. In October 1987 a hole was drilled on this site and cased with steel for the ongoing collection of information.


APEX PARK
1
2
3
CURETON AVE
4
5
EIGHTH ST
P.O.
ELEVENTH ST
CHAFFEY AVENUE
RANFURLY WAY
6
7
RIVER RD
8
LAKE RANFURLY
10
9
MERBEIN
MCEDWARDS ST
LAKE HAWTHORN
DEAKIN AVENUE
12
11
SEVENTEENTH ST

The hole is approximately 440 metres deep and revealed the following sediments:

Depth below surface	**Sediment**
0-24 metres	Blanchetown Clay
24-94 metres	Parilla Sand
96-157 metres	Bookpurnong Beds
157-192 metres	Duddo Limestone
192-239 metres	Ettrick Marl
239-360 metres	Olney Formation
360-440 metres	Warina Sands
440+ metres	Pre-Tertiary Basement

Analysis of the Warina Sands revealed that highly saline water is carried by these sands, and that the saline water is under considerable upward pressure. Further investigation is needed to determine the extent to which this deeper groundwater is contributing to the salinity of the Murray River.

9. Lake Hawthorn Outfall

The role of Lake Hawthorn taken in context with the complete Murray salinity mitigation is modest. However, significant salinity mitigation is achieved in the autumn periods when River Murray flows at Merbein are low and water usage in Sunraysia areas is high.

Lake Hawthorn has the available resources to re-regulate all drainage effluent passed to it. The saline water can either be pumped to the inland disposal basins or pumped or gravitated past this site to the Murray River, depending on river levels.

The Lake Hawthorn outfall is infamous for being the site from where the European Carp escaped into the Murray River and began a wave of destruction of the finely tuned ecology of the river.

10. Merbein Pumping Station

The Merbein Pumping Station at the Base of Pump Hill is necessary to lift water 30 metres to the Merbein Irrigation District which lies above the level of the remainder of the Sunraysia Irrigation District.

Behind the pumping station on the Victorian side of the River it is possible to see the White Cliffs (below Mildara Winery) by which Merbein was originally named.

The pumping station was opened in 1910 and uses about $250,000 of electricity each year. The pumping station supplies approximately 3300 hectares farmed by 468 irrigators in the Merbein Irrigation district.

The pumping station is not a salinity control structure. However the quality of the river water that is supplied to Merbein irrigators is of concern, as is the quantity of saline drainage water to be disposed.

While driving from Pump Hill along McEdwards Street on your way around to Lake Hawthorn you will notice on the left hand side of the road the remains of the old concrete lined channel which used to supply part of the Merbein Irrigation District. The channel has since been replaced by pipeline which ensures efficient distribution of water to the district and reduces the chance of seepage to the regional water table. You will also notice on both sides of the road the large number of properties which have under tree or under vine sprinklers, illustrating the principle of efficient application of water.

11. Lake Hawthorn

Lake Hawthorn has three prime functions:

(a) as a drainage detention pondage;

(b) as a point of diversion control for both pumped and gravity releases, and;

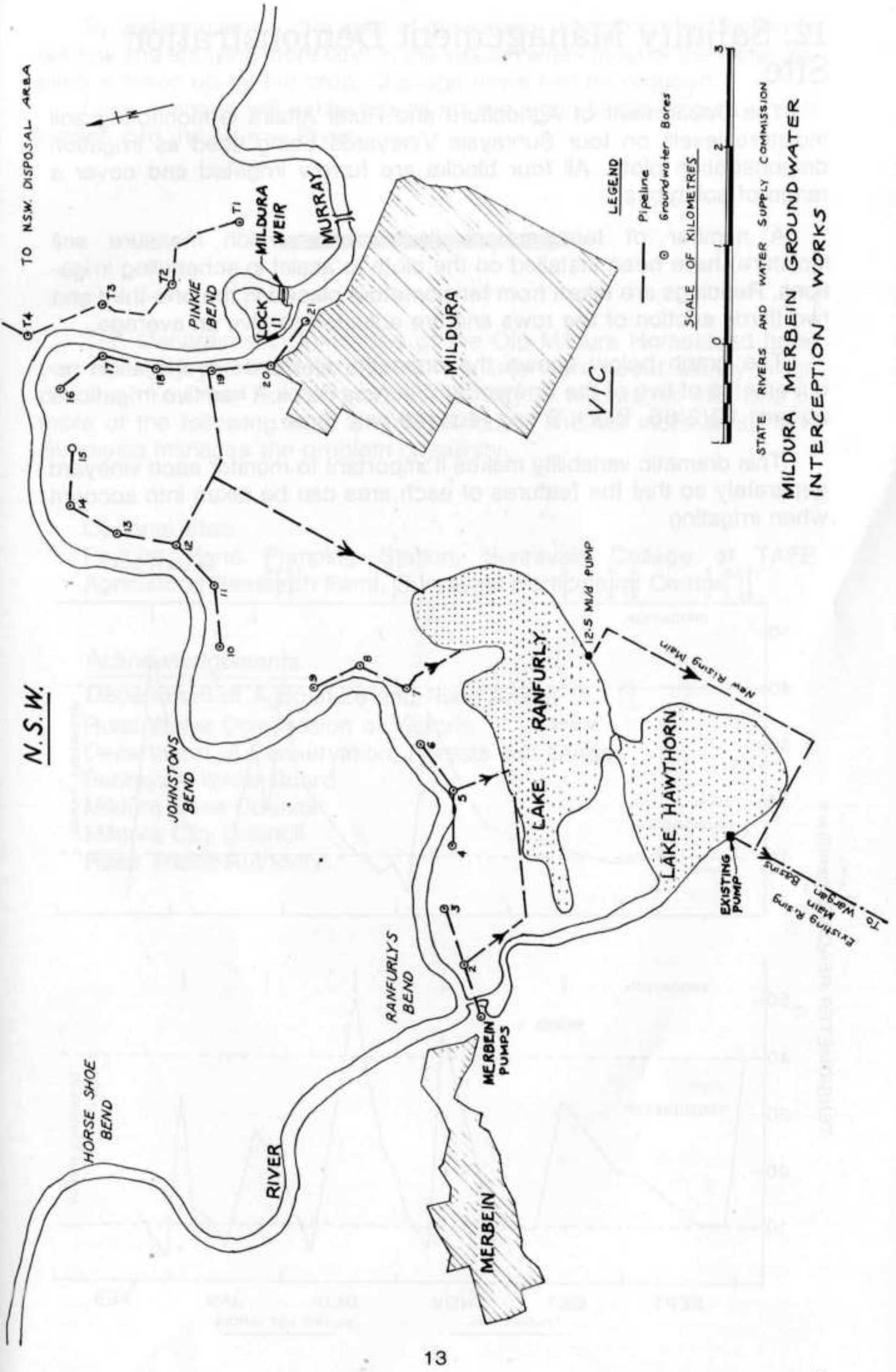
(c) as an evaporation basin.

Lake Hawthorn accepts drainage from four major systems which service the western and southern areas of the Mildura irrigated areas, and the eastern and southern sectors of the Merbein District.

The Lake also acts as a groundwater collector, accepting groundwater seepage of high salinity from the surrounding lands.

The salinity of drainage water outfalled to Lake Hawthorn is generally in the range 1500 to 3500 EC. The salinity of water currently stored in the Lake varies between 4000 and 7000 EC units.

In addition to its role in salinity control, Lake Hawthorn is home to the Lake Hawthorn Sailing Club which boasts a strong membership, good sailing conditions, and welcomes visitors at any time.



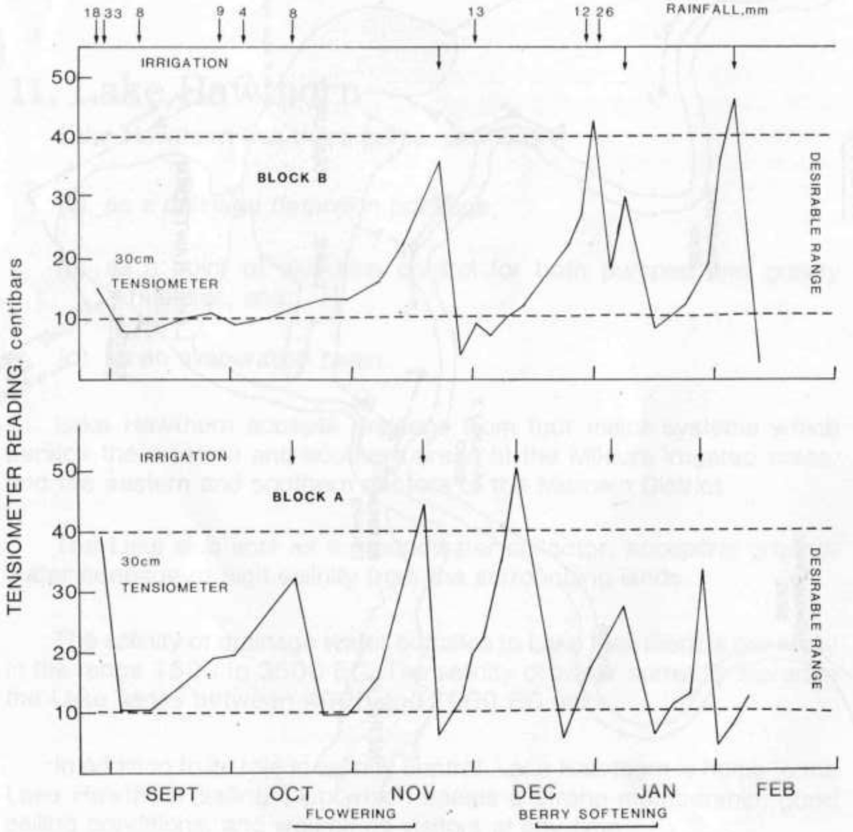
12. Salinity Management Demonstration Site

The Department of Agriculture and Rural Affairs is monitoring soil moisture levels on four Sunraysia Vineyards being used as irrigation demonstration plots. All four blocks are furrow irrigated and cover a range of soil types.

A number of tensiometers (instruments which measure soil moisture) have been installed on the plots to assist in scheduling irrigations. Readings are taken from tensiometers placed in the one-third and two-thirds section of the rows and are adjusted to give an average.

The graph below shows the dramatic difference in irrigation requirements of two of the vineyards. Whereas Block A had five irrigations up until 10/2/88, Block B had required only three.

This dramatic variability makes it important to monitor each vineyard separately so that the features of each area can be taken into account when irrigating.



By watering less at the start of the season when crop requirements are low and applying more later in the season when most of the water applied is taken up by the crop, drainage flows can be reduced.

Less drainage will achieve a direct reduction in the amount of salt carried into the Murray River.

The Management Committee of the Old Mildura Homestead hope you have enjoyed this tour and learnt a little more about salinity in the process. You may like to return to the City of Mildura, or visit one or more of the following sites where you could find out more about how Sunraysia manages the problem of salinity.

Optional sites:
Psyche Bend Pumping Station, Sunraysia College of TAFE Agricultural Research Farm, Sunraysia Horticultural Centre.

Acknowledgements:

Department of Agriculture and Rural Affairs
Rural Water Commission of Victoria
Department of Conservation, Forests and Lands
Sunraysia Water Board
Mildura Shire Council
Mildura City Council
Road Traffic Authority.

SUNRAYSIA DAILY PRINT